many days of perfect calm; the summer was, however, more stormy than the winter. The winds came chiefly from the west—those from a due westerly direction being most common—and also from west-south-west or north-west. The westerly and south-westerly winds were during the winter the warmest, which is ascribed to the circumstance that they passed over mountains some 6000 feet in height, which rendered them "Föhn-like." The barometer readings were never attended by violent storms; these occurred without exception when the glass stood at "fair." There was no aurora australis, nor were there any thunderstorms.

Explorations of the island were undertaken on several occasions, and many of the peaks in the neighbourhood of Royal Bay were climbed. The slate rocks were very difficult of ascent. The enormous glaciers in the mountains of the interior prevented, unfortunately, any thorough exploration of this part. The mountains often sloped abruptly into the sea, and the highest points were about ten miles from the station and covered with eternal snow. The roar of avalanches was continually heard. The fauna was very poor. That such a dreary climate should boast of a very extensive fauna or flora was hardly to be expected; nevertheless, the mosses were very fine. Dr. H. Will, the botanist, collected about thirty varieties. They show what a climate where the sun is nearly always absent can produce in the way of plants which are able to resist rapid changes of temperature, but the fauna is one which may at once be said to belong to more Antarctic regions than Terra del Fuego, the Kerguelen Islands, and more northerly places. It is a repetition of the same types, with originality in details alone.

CARTOGRAPHICAL WORK IN RUSSIA

We learn from a recent issue of the *Izvestia* of the Russian Geographical Society that the following geodetical and cartographical work was done during the year 1883 by the officers of the Russian General Staff. The first-class triangulation for connecting the line of Warsaw and Grodno with that of the Vistula was continued; the secondary network of triangulation was extended in Lithuania and Poland; and the heights of 262 places were determined by careful levellings. The most useful work of exact levellings on the Russian railways, undertaken several years since, was continued in West and South-West Russia, leading to a precise measurement of the differences of level between the Baltic and the Black Seas, and the final results are now being calculated. The Russian survey was continued on the scales of 1400 and 1750 feet to an inch, in Poland, Lithuania, Bessarabia, and Finland; and a most welcome feature of it is that great attention was given to the measurements of heights, so that a map with level-lines only, 35 to 70 feet apart from one another, may be published. In the Caucasus very accurate measurements of the latitudes and longitudes of Tiflis, Baku, and Shemakla were made, as also pendulum observations in Trans-Caucasia. Of trigonometrical measurements, the triangulation of the Trans-Caspian region was continued as far as the Persian frontier, and that of Akhal-Tekke, was also calculated. An interesting feature of this last was the measurement of two geodetical bases on strings which method gives, as is known, very satisfactory results—together with a much greater economy of time. Detailed surveys were continued in several parts of the Caucasus, those at Askabad, and between Kyzil-Arvat, Bami, and the Sumbar River (two versts to an inch) being especially worthy of notice.

In Turkestan, at the Tashkend Observatory, Col. Pomerantseff continued his observations of minor planets with the refractor of the Observatory, and the measurement of stars by means of the meridian-circle; and his assistant, Capt. Zalessky, regularly made measurements of occultations of stars by the moon. The work of the Observatory will soon be published, and will contain an elaborate paper by Dr. Schwartz, on magnetism in Turkestan. Several most valuable determinations of latitudes and longitude were made by M. Putyata in the Pamir during M. Ivanoff's expedition. Among many surveys which were made this year, that of the northern slope of the Turkestan ridge was especially interesting, no less than twenty-three unknown glaciers having been discovered at the sources of the Sokh, and mapped. The Shemanovsky glacier, eight miles long, and that of Ak-terek, twenty-two miles long, which joins the well-known Zarafshan glacier, are especially worthy of notice. A survey of the rich oasis of Karshi, and of the Bokhara dominions on the right bank of the Zarafshan, is also very interesting. The map of Turkestan on the scale of ten versts (seven miles) to an inch, is already in print, and several sheets are nearly ready.

In the Omsk military district we notice several determinations of latitudes and longitudes, as also the survey of the Kirghiz Steppe, on a scale of five versts to an inch. In Eastern Siberia the chief work was the further extension of the triangulation of Trans-Baikalia—a most necessary work, on account of the scarcity of determined points to fix the surveys in that region—and many local surveys, those in the Ussuri region and on the Pacific coast being especially interesting. The astronomically determined points, very few on the whole, have received only seven additions.

The Hydrographical Department has pursued its work on the Baltic, the Black, and the Caspian Seas, as also on some lakes in the interior of Russia and Finland; the most interesting of them being several detailed maps of the Lake of Onega, and the Lakes Päyänne and Pielis, in Finland; the triangulation and surveys on the Caucasian coast of the Black Sea; and the survey of the Gulf Mortvyi Kultuk of the Caspian.

Among the publications of the General Staff we notice the thirty-ninth volume of its *Memoirs*, which contains the following papers:—On the triangulation of Bessarabia, by Col. Lebedeff; on the difference between the longitudes of Tashkend and Vernyi, by Col. Pomerantseff; on astronomical determinations made in Trans-Baikalia (fifty-two places), by Capt. Polanovsky; in the Altay region and in West Siberia (thirteen places), by Col. Miroshnitchenko; in the Trans-Caspian region (with a map), by Col. Gladysheff; and in North-West Mongolia, by Lieut. Rafailoff; on levellings on Russian railways; on the determination of time by means of the meridian-circle, by M. Gladysheff; on the Trans-Caspian triangulation (ninety-two places), by Capt. Pervas, in which it is stated that Askabad is 827 feet, and Mount Riza, on the Persian frontier, 9741 feet, above the sea-level; and finally, a description by Col. Alexandroff of the route from Kungrad to the Gulf of Mortvyi Kultuk, the distance being 300 miles, of which about 90 miles are without water.

The Annual Report of the Hydrographical Department contains seven small maps showing the exact results of the surveys made on the Russian coasts up to 1882; and a paper by M. Goloviznin gives at the same time a sketch of the hydrographical work done by the Russian fleet since its first formation in 1696.

SCIENTIFIC SERIALS

In the *Journal of Botany* for January Mr. H. N. Ridley describes and figures the extremely rare *Juncus tenuis*, a plant entirely lost to Britain since 1795 or 1796, when it was gathered by G. Don in Clova, till 1883, when it was rediscovered by Mr. Towndrow in Herefordshire. Mr. W. H. Beeby records another interesting addition to the British flora in a new *Sparganium*, which he names *S. neglectum*, nearly allied to *S. ramosum*, and probably a sub-species of it, found in ponds in several parts of Surrey.

The last part of the *Belgique Horticole* that has reached us, that for May and June 1884, contains but little that is original, the substantial articles being taken from French, German, or English journals. The coloured plates of new or little-known plants, with accompanying descriptions, are of their usual excellence, and there are many short paragraphs of interest to horticulturists.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, January 29.—"On some Physical Properties of Ice and on the Motion of Glaciers, with special reference to the late Canon Moseley's Objections to Gravitation Theories." By Coutts Trotter, M.A., Fellow of Trinity College, Cambridge. Communicated by Prof. Stokes, Sec. R.S.

Canon Moseley's theory of glacier motion, put forward in 1855, has never been accepted by persons conversant with glaciers. In 1869, however, he put forward a somewhat formidable objection to the current gravitation theories of glacier motion.

The gist of the objection is that the resistance of ice to shearing is many times greater than the shearing force which can be produced in a descending glacier by gravity; and that therefore the shearing which the measurements of Forbes and others have shown to be an essential part of the motion of a glacier cannot be produced by gravity alone.

It was pointed out at the time that in Moseley's experiments on the shearing strength of ice the element of time had been disregarded, and a number of experiments have been since published, chiefly on the bending of pieces of ice under the influence of their own weight, which showed conclusively that the continuous action for a considerable time of comparatively small forces will produce effects upon ice which the same forces are quite incapable of producing in a short time. The nature and conditions of the motion were, however, very different from those which we meet with in a glacier.

Under these circumstances it seemed desirable that fresh direct experiments on the shearing strength of ice should be made under conditions differing as little as might be from those under which ice actually shears in the interior of a glacier, and it occurred to me that such experiments might be advantageously made in one of the artificial grottoes which are now excavated year after year for the benefit of tourists in several of the more accessible Swiss glaciers. It seemed that it would be possible in this way to carry out experiments upon glacier ice at a nearly uniform temperature of about 0° C., and under conditions as nearly resembling those of the interior of a glacier as we can hope to attain to in experiments on hand specimens of ice.

I accordingly spent part of the long vacation of 1883 at Grindelwald, and made a series of experiments in the grotto on the right bank of the lower glacier, in order to see whether I could obtain direct evidence of shearing under the influence of forces comparable with those which Canon Moseley admits to be capable of being produced by the action of gravity in a moving glacier.

The experiments are fully described in the paper. Bars of ice were passed through holes in three parallel blocks of wood, nearly in contact with one another. The two outer blocks were hung to a frame and a weight was suspended from the middle one. After the whole had hung for some days, the apparatus was taken to pieces and the shear measured. In a final experiment a shear of about ·075 cm. was observed after the action for about seventeen days of a shearing force of rather more than 200 grm. per square centimetre.

The shearing force employed was indeed rather more than double that which, according to Canon Moseley's calculations, is exerted by gravity in the Mer de Glace, near the Tacul (*Phil. Mag.* xxxvii. p. 369); but it is about 1/25th of his smallest value of the shearing strength of ice, and the amount of shear is larger than is implied in any of the ordinary cases of glacier motion.

I think then that there is little doubt that under conditions closely resembling those of the interior of a glacier, and under the influence of forces comparable with those which gravity is capable of exerting in a glacier, hand specimens of ice shear in the same manner as a truly viscous solid would do.

Reasons are given for supposing that the range of temperature through which ice is sensibly viscous is small; the temperature of the interior of a glacier is discussed, and it is pointed out that the position of the "Bergschrund" so familiar in Alpine literature corresponds to a point where there is a change in the temperature of the lower part of the glacier, all below the "Bergschrund" being soft and viscous, all above it hard frozen and immovable.

The general result of the foregoing paper seems to be that the fuller consideration of the physical properties of glacier ice leads to essentially the same conclusions as those to which Forbes was led forty years ago by the study of the larger phenomena of glacier motion—that is, that the motion is that of a slightly viscous mass partly sliding upon its bed, partly shearing upon itself under the influence of gravity. To say this is, however, by no means to deny the importance of regelation in the economy of a glacier. To regelation mainly we must attribute the gradual passage of snow through the form of *névé* into ice, the healing of crevasses, and the possibility of comparatively rapid and violent changes of form in portions of a glacier in which unusually powerful forces may be supposed to be at work. Moseley's argument, however, seems to be decisive against the belief that the ordinary comparatively undisturbed descent of a glacier along a moderately sloping bed takes place by fracture and regelation. Moseley's value of the shearing strength of ice, which has been shown to be enormously too great as a measure of the resistance of ice to slow shearing, would appear on the other hand to be an inferior limit to the resistance to the shearing fracture which must precede regelation.

Royal Society, January 29.—"On the Structure and Rhythm of the Heart in Fishes, with especial reference to the Heart of the Eel." By J. A. McWilliam, M.D., Demonstrator of Physiology in University College, London. (From the Physiological Laboratory, University College.) Presented by E. A. Schafer, F.R.S.

The eel's heart presents some peculiarities in structure. The auricle and ventricle are separated by a canalis auricularis. The ventral wall of the sinus venosus does not end in the proper auricular tissue but passes on to be attached directly to the ventricle. The superficial part of the ventricular wall is supplied by a special system of blood-vessels.

When the ventricle is faradised, it is found that a slowly-interrupted current (*e.g.* 3 per second) has a much more powerfully stimulating effect than a rapidly-interrupted current (*e.g.* 50 per second) of precisely the same strength.

The inhibitory effects of stimulation of the vagus nerve-trunk are very powerful; the accelerating after-effects are slight and variable. Vagus stimulation exerts no *direct* influence on the ventricle; it profoundly affects the auricle and sinus. It temporarily abolishes the excitability of the auricular muscle and of the muscular tissue entering into the composition of the ostial part of the sinus.

The manner in which the heart's action recommences after vagal inhibition is peculiar; the interjugular part of the sinus and the ventricle beat before the auricle and the ostial part of the sinus begin.

The passage of a weak interrupted current through any part of the auricle causes that part to stand still while the rest of the auricle goes on beating. Curara obviates the occurrence of this localised inhibition.

Physical Society, January 24.—Prof. Guthrie, President, in the chair.—Messrs. J. Rose Innes, A. Howard, and A. M. Worthington were elected members of the Society.—Some lecture experiments on spectrum analysis were shown by Mr. E. Clemenshaw. The chief point in these experiments was the production of a brilliant light without the use of the electric arc. A small quantity of a solution of the salt to be experimented on is put into a flask in which hydrogen is being evolved by the action of zinc upon dilute sulphuric or hydrochloric acid; the bottle is provided with three necks, one being fitted with an acid funnel, one with a jet, and by the other is introduced a current of coal-gas, or better, of hydrogen, by which the size of the flame can be increased and regulated. The jet, which is about one-eighth of an inch diameter, is surrounded by a larger tube, by which oxygen is admitted to the flame, the result being a brilliant light giving the spectrum of the substance, which is carried over mechanically by evolved hydrogen. The spectra of sodium, lithium, and strontium were shown upon the screen, and the absorption of the sodium light by a Bunsen flame containing sodium was clearly seen.—An instrument to illustrate the conditions of equilibrium of three forces acting at a point was exhibited by Mr. Walter Baily. This instrument consists of a circular disk of soft wood from the back of which an axle projects. The disk is provided with a graduated circle, and its centre marked by the intersection of two fine lines upon a small mirror. Three compound threads, each consisting of two threads connected by a short piece of elastic, are knotted together, the free end of each being fastened to a pin. Two of these pins are stuck into the disk at such a distance from the centre that the knotted ends cannot reach the centre without stretching each thread, and the remaining pin is then adjusted so that this condition is fulfilled. There are now three forces in equilibrium acting at the knot. The angles between their directions are obtained from the readings of the graduated circle where it is crossed by the threads. To determine the magnitude of these forces, the axle of the disk is held horizontally and turned till a thread is vertical; the pin is then removed, a scale-pan attached to the end of the thread, and weights added till the knot is brought back to the centre. This is repeated with the other threads. It was found possible to show the proportionality of the forces to the sines of the opposite angles with an error not exceeding 1 per cent.—Mr. C. H. Hinton read a paper on the "Poiograph." As the result of a process of metaphysical reasoning, Mr. Hinton has come to the conclusion that relations holding about "number" should be extended to space. Starting from the premiss that the relation of a number to a number is a number, *e.g.* the "relation" of 6 to 2 is 3, the author proceeds to carry these principles into the consideration of space, and concludes that, when properly understood, the relation of a shape to a shape is a shape, and that of a space to a space is a space. The shape that shows the relation of a shape to a shape is called a "poiograph." To form a poiograph the content of each shape is neglected, and the shape is represented by a point, each point being by its coordinates representative of the properties of the shape considered. The resultant shape is a "poiograph."

Anthropological Institute, January 27.—Anniversary meeting.—The retiring President, Prof. Flower, LL.D., F.R.S., in his anniversary address, gave an outline of the classification of the varieties of the human species which appeared to him to be most in accordance with the present state of knowledge on the subject, but which, he remarked, differed in its main outlines but little from that adopted by Cuvier sixty years ago. It was first stated that there were three extreme types, those called by Blumenbach Ethiopian, Mongolian, and Caucasian, around which all existing individuals of the species could be ranged, but between which every possible intermediate form could be found. The distinctive characters of each of these extreme types were described and their subdivisions pointed out. The Ethiopian or Negro branch was divided into (1) African Negroes; (2) Hottentots and Bushmen; (3) Oceanic Negroes or Melanesians; (4) Negritos, of which the natives of the Andaman Islands are representatives. It was suggested that the Australians, who have always presented a difficulty in classification of the races of men, owing to the combination of negroid characters of face and skeleton, with hair of a different type from that of the rest of the group, were probably not a pure race, but descendants of a cross between an original Melanesian population and later intruders, probably from the South of India, and of Caucasian descent. The Mongolian type was represented in an exaggerated form by the Eskimo, in a typical condition by the greater number of the inhabitants of Northern and Eastern Asia, the Tartars, Chinese, Japanese, &c., and in a modified or sub-typical form by the Malays. The brown Polynesians were still further modifications of the same type, greatly mixed with Melanesian and possibly also Caucasian blood. The position of the native races of America was next discussed. Excluding the Eskimo, they all form one group, which, although inclining on the whole nearer to the Mongolian than any of the three great types, had so many special features that it might be looked upon as forming a fourth primary division. The Caucasian, or white branch, includes two sub-races now much mingled together, the Xanthochroi, with fair hair and eyes, and the Melanochroi, with dark hair, eyes, and complexion. To the former belong the inhabitants of Northern Europe, to the latter chiefly those of Southern Europe, Northern Africa (greatly mixed in varied proportions along their frontier line with Negroes), and South-West Asia, the principal sub-divisions being the Aryans, Semites, and Hamites. The address concluded by a reference to two members of the Council lately deceased, Dr. Allen Thomson and Mr. Alfred Tylor; to the change of locality of the meetings which had taken place during the year from St. Martin's Place to Hanover Square, and to other matters relating to the affairs of the Institute. The election of W. Pengelly, F.R.S., was announced. The following gentlemen were elected officers and Council for the year 1885:—President: Francis Galton, M.A., F.R.S.; Vice-Presidents: Hyde Clarke, John Evans, F.R.S., Prof. W. H. Flower, F.R.S., Lieut.-Col. H. H. Godwin-Austen, F.R.S., Major-Gen. Pitt-Rivers, F.R.S., E. B. Tylor, F.R.S.; Director: F. W. Rudler, F.G.S.; Treasurer: F. G. H. Price, F.S.A.; Council: S. E. B. Bouverie-Pusey, E. W. Brabrook, F.S.A., C. H. E. Carmichael, M.A., W. L. Distant, A. W. Franks, F.R.S., J. G. Garson, M.D., Prof. Huxley, F.R.S., Prof. A. H. Keane, B.A., A. L. Lewis, Sir J. Lubbock, Bart., M.P., R. Biddulph Martin, M.P., Prof. A. Macalister, F.R.S., J. E. Price, F.S.A., Charles H. Read, F.S.A., Charles Roberts, F.R.C.S., Lord Arthur Russell, M.P., W. G. Smith, F.L.S., Prof. G. D. Thane, C. Staniland Wake, M. J. Walhouse, F.R.A.S.—It was announced that at the next meeting of the Institute, on February 10, a paper would be read by Mr. H. H. Johnston, on the tribes of East Equatorial Africa.

Entomological Society, January 21.—Anniverary Meeting.—J. W. Dunning, M.A., F.L.S., President, in the chair.—An abstract of the Treasurer's accounts was read by Mr. H. T. Stainton, F.R.S. (one of the Auditors); and the Secretary read the Report of the Council.—The following gentlemen were then elected as the Council for 1885:—President: R. McLachlan, F.R.S.; Treasurer: E. Saunders, F.L.S.; Secretaries: E. A. Fitch, F.L.S., and W. F. Kirby; Librarian: F. Grut, F.L.S.; other Members of Council: T. R. Billups, J. W. Dunning, R. Meldola, J. W. Slater, H. Druce, H. Goss, S. Stevens, and J. Jenner Weir.—The retiring President then delivered an address, and a vote of thanks was moved to him by Mr. Stainton and seconded by Mr. J. W. May, and Mr. Dunning replied.—A vote of thanks to the officers was then moved by Mr. McLachlan and seconded by Mr. Waterhouse, and Messrs. Saunders, Fitch, Kirby, and Grut replied.

Victoria Institute, February 2.—A paper on the origin of savage nations by degradation was read by Mr. F. A. Allen, in which he said he only desired to suggest that this was not an unreasonable assumption, and he proceeded to show that traces of a high degree of civilisation either recorded by history or tradition existed amongst many of those peoples which were now generally regarded as savages.

EDINBURGH

Royal Society, January 19.—A. Forbes Irvine, Vice-President, in the chair.—Mr. J. B. Readman gave a paper on the ores of nickel and cobalt of New Caledonia. These ores have only recently been identified, although they are met with in great abundance.—Prof. Tait called attention to the expressions used by Newton in the scholium to his "Laws of Motion" when speaking of Mariotte, as contrasted with the expressions he used when speaking of Wren and Huyghens.—Prof. R. Smith communicated a paper on the graphic analysis of the kinematics of rigid-bar mechanisms.—Prof. Tait gave a communication on the necessity for a condensation nucleus. This involves a modification of Prof. J. Thomson's hypothetical form of the isothermals of a true vapour. In the modified form the isothermal shows at once the necessity for the condensation nucleus.

Royal Physical Society, January 21.—John A. Harvie-Brown, F.R.S.E., F.Z.S., &c., President, in the chair.—The following communications were read: On the ova and the ovary of Echidna, by F. E. Beddard, M.A.Oxon, F.R.S.E., F.Z.S.—Investigations on the movements and food of the herring, with additions to the marine fauna of the Shetland Islands, by Fred. G. Pearcey.—Notes on the birds of the Island of Eigg, by William Evans, F.R.S.E.—Mr. B. W. Peach, F.R.S.E., &c., read a paper by Mr. Robert Ridston, F.G.S., on impressions of rain-drops, recent and fossil, with exhibition of specimens.—Mr. J. A. Harvie-Brown, F.Z.S., &c., exhibited, with remarks, a specimen of *Larus Kumlieni*, from Cumberland Inlet; also of *Larus Sabini*, and other species of arctic gulls.

DUBLIN

Royal Society, December 15, 1884.—Section of Physical and Experimental Science.—Dr. W. Frazer in the chair.—On a photometer made of paraffin, by J. Joly, B.E. If a prism be cut from a translucent substance, such as paraffin, and so exposed to a source of light that only one of its faces is illuminated, the light diffused through the substance and reflected out through the unilluminated faces of the prism gives it an appearance as if lighted up internally. Two such prisms laid together on smooth faces and receiving light from separate sources (placed so as to be at opposite sides of the plane of division) have the appearance of two luminous bodies laid side by side. When the quantity of light received by each prism is the same, the effect is as if the whole substance was uniformly self-luminous; and if, further, the light from each source is similar in colour, it is difficult to detect the presence of a divisional plane. The prisms are so cut as to lie symmetrically about the plane of contact, and shifted between the sources of light till the trace of the plane of division vanishes. From the close juxtaposition of the surfaces under comparison, the arrangement is a sensitive one.—On artificially-produced gold crystals, by William N. Allen. A neutral solution of chloride of gold and sodium deposited in the course of a few hours lamellæ of metallic gold, which, on examination, proved to be perfectly-formed crystals similar to the native forms figured in Muspratt's chemistry. The largest observed crystal was 3/1000 inch in diameter.—Recent advances in physical science, by Prof. G. F. Fitz Gerald, F.R.S.:—(1) The transference of energy in the electro-magnetic field (Prof. Poynting); (2) The motion of an electrified sphere (J. J. Thompson).—Note on a remarkable belt seen on Saturn on December 6 and on this evening (15th), by G. Johnstone Stoney, D.Sc., F.R.S. The belt consisted of a thin dark line, almost black, above the ring, *i.e.* south of it, with a broad, shaded, bright band between it and the ring, which was so shaded as to give the appearance of a swelling round the equatorial part of the planet.—On the results of analyses of milk, cream, and butter at a recent dairy show, by R. J. Moss, F.C.S. Cream obtained by the separator was found to be very much richer in "solids, not fat," than cream obtained by the ordinary process of skimming. Butter made by different dairy-maids from the same cream and under identical conditions was found to vary chiefly in casein. The minimum quantity of casein found in this butter was 0·32 per cent., the maximum 1·17 per cent. It was observed that the specimens that received the highest awards from the judges were those that contained most casein.—A new form of ammonium chloride inhaler was exhibited by A. M. Vereker.

Natural Science Section.—On *Peachia hastata* (Gosse). Part i., description and habits, by Prof. A. C. Haddon and G. Y. Dixon. A description of the form, colour, and markings, and the variations of the conchula of specimens recently found in Dublin Bay, and an account of its habits supplementing that of Gosse.—Canadian, Archæan, or pre-Cambrian rocks, with a comparison with some of the Irish metamorphic rocks, by G. H. Kinahan, M.R.I.A.—Notes on apatite from Buckingham, Ottawa Co., Canada, by G. H. Kinahan, M.R.I.A.—A set of musical stones from Cumberland, now in the Science and Art Museum, were exhibited and described by B. H. Mullen. Specimens showing the mode of occurrence of *Sclerotium varium*, Berkeley, were exhibited by T. Carroll.—The communication on *Halcampa Andresii*, November 17, was by Prof. A. C. Haddon.

Sydney

Royal Society of New South Wales, December 3, 1884.—H. C. Russell, B.A., President, in the chair.—Sir George Biddell Airy, K.C.B., F.R.S., &c., and Prof. John Tyndall, D.C.L., F.R.S., &c., were elected Honorary Members; three new ordinary Members were also elected.—The Society's medal and 25*l*. were awarded to Mr. W. E. Abbott, of Wyngen, for his essay upon "Water Supply in the Interior of New South Wales." None of the papers upon "Origin and Mode of Occurrence of Gold-bearing Veins and of the associated Minerals," or "On the Infusoria peculiar to Australia," were considered of sufficient merit to be awarded the prize. No communication was received upon "Influence of the Australian Climate in producing Modifications of Diseases."—The following papers were read:—Notes on Doryanthus, by C. Moore, F.L.S., illustrated by specimens of a new species.—Notes upon a new self-registering anemometer, by H. C. Russell, B.A., F.R.A.S.—Water-supply in the interior of New South Wales, by W. E. Abbott.—Mr. C. S. Wilkinson, F.G.S., exhibited some experiments to illustrate the nature of comets and to explain the reason for the tail being usually turned from the sun.

December 17, 1884.—H. C. Russell, B.A., President, in the chair.—Mr. Caldwell exhibited specimens illustrating his researches into the embryology of the Marsupiala, Monotremata, and Ceratodus.

Paris

Academy of Sciences, January 26.—M. Bouley, President, in the chair.—On the limit of accuracy in the differential formulas employed in the reduction of meridian observations, by M. M. Lœwy.—On the chemical neutrality of the salts, and on the use of colouring substances in the quantitative analysis of the acids, by M. Berthelot. In the present paper the author proposes to generalise the results already obtained in the use of several new colouring substances endowed with special properties of late years introduced into the process of chemical analysis. He gives the thermic interpretation of the effects distinguishing these substances, which are acids and salts whose proper reactions are determined by the laws of saline statics.—Note on the pyro-electricity of the topaz, by MM. C. Friedel and J. Curie. From their experiments the authors conclude that the crystals of topaz possess not only the already determined pyro-electric vertical axis parallel to the axis of the prism, but also a horizontal axis of pyro-electricity present at least in some specimens examined by them. But, owing to the limited number of these specimens, it is impossible clearly to define the position of the horizontal axis. The intensity of the electricity developed varies with the specimens themselves, in some of which the two extremities of the axis are of like sign, which may be explained by the existence of superimposed hemitropic lamels.—Note on the modifications produced in the chemical composition of certain secretions under the influence of epidemic cholera, by M. Gabriel Pouchet.—On the development of the egg of *Phylloxera punctata*, which infests the *Quercus sessiflora*, by M. V. Lemoine.—Chief results of the examination made at Toulouse during the years 1876-1883 of the observations of Saturn's satellites, by M. B. Baillaud.—Discussion of the results obtained with the Daguerrotype pictures of the French Commission appointed to observe the Passage of Venus in 1874, by M. Obrecht. The author concludes that the parallax of the sun, as deduced from the observations made by MM. Baille and Gariel, is found to vary between 8″·77 and 8″·33. This coincides with the 8″·66 with a probable error of 0″·06 already obtained by M. Bouquet de la Goye from the same data.—Results of the observations of the solar spots and faculæ made during the last quarter of the year 1884, by M. Tacchini. The results for the whole year, as compared with 1883, show that the period of greatest solar activity comprised the eight months from October, 1883, to May, 1884.—On a class of partially derived equations of the first order, by M. E. Picard.—On a special case of reduction in linear equations of the fourth order, by M. E. Goursat.—On the forms capable of integration in linear equations of the second order, by M. R. Liouville.—On the phenomena of condensation which take place in steam-engines during the period of admission, by M. F. Delafond.—Remarks on the dangers incidental to mechanical generators of electricity, and on the best means of avoiding them, by M. A. d'Arsonval.—On the ammoniacal sulphates of zinc, and on a means of separating a purely aqueous solution into two distinct layers, by M. G. André.—On the heat of formation of the sulphite and bisulphite of ammoniac, by M. de Forcrand.—Remarks on the cardiac hypertrophy occurring during the period of growth, usually between the years eight and twenty-one, by M. Germain Sée.—On the differential morphological characters of the young colonies of comma-bacillus cultivated in gelatine, by MM. Nicati and Rietsch.—Analysis of a chrysostile (a fibrous serpentine presenting the appearance of asbestos); a silica resulting from the action of acids on serpentine rocks, by M. A. Terriel.—Note on the geological phenomena produced by the earthquakes that took place in Andalusia from December 25, 1884, to January 16, 1885, by M. A. F. Noguès. A description is given of the crevasses, landslips, upheavals, subsidences, and other remarkable phenomena accompanying these disturbances.—M. Prestwich was elected a member for the Section of Mineralogy in the place of the late Signor Sella.

Berlin

Meteorological Society, January 6.—Prof. Müttrich gave a short historical review of the arrangements in connection with forest meteorological stations in Prussia, seventeen of which were in operation. They were established on as uniform a system as possible over regions of very wide varieties of climate: on plains and at different levels above the sea, in districts having a more continental, and in districts having a more oceanic, climate, and in leaf and pine forests. In all these places, moreover, observations were made according to precisely the same regulations. Each station was twofold, having one equipment in the wood, another in the open field; both, as a rule, at a distance of 200 metres from the edge of the wood. The observations comprised the atmospheric pressure, the temperature of the air and of the ground, the wind, moisture, cloudiness, atmospheric precipitation, and the evaporation of an open mass of water. These observations were made twice a day—at 8 a.m. and 2 p.m. The observations thus obtained were collected at the station of Eberswalde, and published regularly in monthly and yearly reports. From the body of observations made at thirteen stations in operation since 1873, Prof. Müttrich had now made a more special investigation into the influence of the forest on temperature. In order to obtain data o serve as a basis for determining the influence exercised by the forests on the daily march of the temperature, he had caused observations to be instituted in Eberswalde every two hours throughout a period of fourteen days from June 15 to 30. The graphical representation of these observations showed that the curve of temperature for the field station, starting from the point reached at midnight, sank a little at first, then rose at a quick, but later on at a somewhat abated, rate to its maximum at about two o'clock, whence it sank again, rapidly at first, then more slowly, to its midnight level. The curve of temperature for the forest station had, generally speaking, an analogous course. At midnight, however, its curve started at a higher point than that of the field station, crossed the latter at 5 a.m., and afterwards continued to be lower than the field curve, till at 8 p.m. it intersected the field curve for the second time, and thence continued above it till midnight. The difference in the maxima of the two curves was considerably greater than the difference in their minima, that is to say, the wood exercised during the day a more powerful cooling influence than it exerted a warming influence during the night. The maximum of the forest curve, besides, occurred from half an hour to an hour later than that of the field curve. For the further study of the influence of forests on temperature, the data of the maximum and minimum thermometers were utilised. From these were calculated the daily variations of temperature for the different months at the different stations, and the yearly course of these variations for each particular field and forest station was exhibited by a curve, the abscissæ of which were the months and their ordinates the mean daily oscillations of temperature. From the curves of the various stations, special curves for the open field, the fir, pine, and beech forests were next deduced. The curve for the field station showed that the daily variations in January and February were within narrow limits and pretty similar, that in March the curve rose, then mounted very rapidly in spring and up to its summer maximum, whence in September it dropped very rapidly, abating, however, its rate of fall in October, and then creeping down very slowly through November and December. The curve for the fir forest was, in January and February, not much different from the foregoing in the same months, but the variations were smaller than in the case of the field station. The curve next rose rather more steeply on to the month of May, and after that proceeded more slowly towards its summer maximum, from which it fell, at first quickly and then slowly. All along, however, it kept inferior to the curve of the field station, the interval between the two being much greater in summer than in winter. In the pine forest the curve marking the variations of temperature showed a similar course, except that from January to April it approached much nearer the curve of the field station than did the curve of the fir forest, while in summer, on the other hand, it kept at a greater distance from that of the field station, but joined the fir-forest curve in autumn. Thus the curve of the pine forest likewise all along kept below that of the field station. The difference between them was less in winter, and in summer it was almost just as great as the difference between the field curve and the fir-forest curve. Altogether different, however, was the curve of temperature and its variations in the beech forest. In January and February it lay at but a very little interval below that of the field station, came up almost quite level with it in spring, or even shot just a very little beyond it, attained its maximum for the year in May, whence it at first rather slowly, but afterwards very rapidly, declined. In the beech forest, therefore, after it put on its full foliage in May, the variations of temperature lowered considerably, showing a very wide difference throughout the months of July and August from the variations of temperature obtained for the same period in the open field. The disfoliaged forest, on the other hand, showed hardly any sign of having affected the variations of temperature. The maxima, as also the minima, of temperatures were likewise calculated by the month for the different stations, and from the data thus obtained the annual curve was drawn. For the open field the curves of the maximum and of the minimum temperatures showed a pretty similar course, the maximum of both occurring in summer, and the rise and fall of the curves being likewise tolerably uniform. For the forest station the curves of the maximum and of the minimum temperatures were different. The maximum curve lay, on the whole, lower than the corresponding curve of the open field. It moreover attained its utmost height in May, resting there, with but slight changes, throughout the summer. In autumn the curve sank, reaching, in winter, quantities not essentially different from those of the field curve. The curve of minimum temperatures, on the other hand, in the case of the forest station, showed higher values than obtained in the case of the free station. In the pine forest the course of the minimum curve came nearer to that of the field curve, and there, too, a maximum was found in summer. In the beech forest, however, the curve attained its maximum as early as May, keeping that level pretty nearly all through the summer, but sinking more rapidly in autumn, and descending lower than did the curve of the pine-forest station. As a result of his investigation, Prof. Müttrich had arrived at certain definite conclusions respecting the influence of the forest on temperature, which may be stated as follow:—(1) The forest exercised a positive influence on the temperature of the air; (2) the daily variations of temperature were lessened by the forest, and in summer more than in winter; (3) the influence of the leafy forest was in summer greater than that of the pine forest, while in winter the tempering influence of the pine forest preponderated over that of the disfoliaged forest. An attempt to determining the influence of the forest on the mean annual temperature led to no sure results.

STOCKHOLM

Royal Academy of Sciences, January 14.—Prof. Sven Lovén gave an account of the work done last summer at the zoological station of the Academy, and of the special reports thereon by Dr. Carl Aurivillius on Ostracoda, M. Wirén on Annelida, and M. Fristedt on sponges.—Prof. Lovén also gave the results of his studies on the species of echinoids described by Linnæus, the fundamental specimens of which, formerly in the cabinet of Queen Lovisa Ulrica, exist still in part in the Museum of the Upsala University.—Prof. Nordenskjöld spoke on the inland ice of Greenland, and on the mineral dust found on the same.—Prof. Torell exhibited a geological map of the southern part of Sweden, published by the Geological Survey of Sweden, and also a map of the northern part, delineated at the same institution. He also described other geological maps of Sweden.—Prof. Smitt reviewed the travels of Dr. Emil Riebeck in Asia and Africa, and communicated a paper by the Rev. F. Hammargren on the bleating-like sound of the common snipe.—Prof. Wittrock communicated papers (1) by M. Henning, on his travels in Herjeådalen with regard to its mycology; (2) by M. G. Lagerheim, on his algological researches in the province of Bohus; and (3) by M. C. J. Johansson, on Taphrina, Fr., and the Swedish species of that genus.—The Secretary, Prof. Lindhagen, presented the following papers, viz.:—New or imperfectly known Isopoda described by Dr. C. Borvallius; on the action of the dioxide of hydrogen on earths; on the combinations of samarium; and new researches on the combinations of didymium, all by Prof. P. T. Cleve of Upsala.

CONTENTS

	PAGE
Sir Henry Cole. By Rev. **Newton Price**	309
Earthquakes and Fire-damp. By **W. Galloway**	312
Magneto- and Dynamo-Electric Machines	313
Our Book Shelf:—	
Murphy's "Key to Magnus's Class-Book of Hydrostatics and Pneumatics"	314
Wormell's "Electrical Units"	314
Milne's "Weekly Problem Papers"	314
Letters to the Editor:—	
Free Hydrogen in Comets.—**Prof. C. Piazzi Smyth**	314
Iridescent Clouds.—**Prof. W. G. Brown; Prof. C. Piazzi Smyth**	315
Manx Cats.—**George J. Romanes, F.R.S.**	316
Cross-Breeding Potatoes.—**Worthington G. Smith**	316
Earthquake.—**J. G. S. Anderson**	316
An Instance of "Protective Resemblance."—J. C. G.	316
Hibernation.—**K. Busk**	317
Our Future Clocks and Watches.—**Edward L. Garbett**	317
The Life-History of the Lycopodiaceæ. By **W. T. Thiselton Dyer, C.M.G., F.R.S.**	317
John Gwyn Jeffreys	317
Alexander Murray, C.M.G.	318
Searles V. Wood	318
A Sunshine Recorder. By **Prof. Herbert McLeod.** (*Illustrated*)	319
Notes	320
Our Astronomical Column:—	
The Occultation of Aldebaran on February 22	322
Variable Stars	322
Wolf's Comet	322
Tempel's Comet	323
Astronomical Phenomena for the Week 1885, February 8–14	323
Geographical Notes	323
The Institution of Mechanical Engineers	324
The Influence of Direct Sunlight on Vegetation. By **Dr. M. Buysman**	324
New Organic Spectra. (*Illustrated*)	326
South Georgia	327
Cartographical Work in Russia	328
Scientific Serials	328
Societies and Academies	328